Twenty years of change in the dietary intake and BMI of Northumbrian adolescents. By E.S. FLETCHER, A.J. ADAMSON and A.J. RUGG-GUNN, *Human Nutrition Research Centre, University of Newcastle, Wellcome Laboratories, RVI, Queen Victoria Road, Newcastle upon Tyne NE1 4LP*

Good nutrition in childhood is essential both for healthy growth and development, and for the prevention of adult disease. Adolescence is a period of rapid growth and development and thus a time of increased nutritional needs. Over the past two decades, public health messages have targeted both adults and children promoting lifestyle change, particularly a reduction in fat intake, an increased intake of complex carbohydrates and maintenance of a healthy body weight. The aim of this study was to measure changes in diet and adiposity of young adolescents living in Northumberland at three time points over a period of 20 years; 1980, 1990 and 2000.

Children in Year 7 (aged ~11.5 years) attending the same seven middle schools in 1980, 1990 and 2000 were invited to take part in a dietary survey. About 400 children took part in each survey (~65% of those invited to participate). The same 2× 3 d food diary followed by interview with a trained nutritionist method was used in each survey (Hackett *et al.* 1984; Adamson *et al.* 1992). The interview clarified the information recorded and used food models to facilitate estimation of portion size. Height and weight were measured in each survey and BMI values were calculated. Contemporary standard food tables, with additions, were used to calculate nutrient intake in each survey.

	1980 (*n* 405)		1990 (*n* 379)		2000 (*n* 424)	
	Mean	SE	Mean	SE	Mean	SE
BMI (all children)	18.25	(0.13)	18.60	(0.16)	19.83	(0.17)
% of BMIs >25	2		4		9	
Energy (MJ)	8.57	(0.08)	8.42	(0.10)	7.99	(0.10)
% Energy from fat	39.8	(0.18)	39.7	(0.20)	34.9	(0.18)
% Energy from starch	26.9	(0.18)	26.5	(0.19)	30.4	(0.18)
Southgate fibre (g)	13.5	(0.19)	15.3	(0.22)	15.5	(0.23)
Vitamin C (mg)	37.8	(0.98)	53.8	(1.64)	76.5	(2.08)
Calcium (mg)						
Boys	849.4	(17.37)	754.5	(18.80)	771.6	(16.70)
Girls	749.2	(15.00)	719.3	(15.60)	671.3	(12.09)
Iron (mg)						
Boys	10.1	(0.17)	11.7	(0.24)	10.1	(0.20)
Girls	9.2	(0.14)	11.2	(0.27)	8.7	(0.18)

The effect of survey was statisitically significant ($P<0.05$) for all the above variables.

Mean BMI had increased at each survey and the number of children with BMI≥25 doubled in each 10-year period. Energy intake fell as has been reported in other surveys (Gregory & Lowe, 2000). Between 1980 and 1990, percentage energy derived from fat showed no change but in 2000 had fallen to be in line with recommendations (DoH, 1991). Fibre intakes increased in 1990 and were maintained in 2000. NSP intakes in 1990 and 2000 were 9.2 g and 10.7 g, respectively. Intakes of vitamin C had increased in 1990 and continued to increase in 2000, to almost twice the RNI (40 mg; DoH, 1991). Against these positive changes, calcium and iron intakes fell and are a cause for concern. Calcium intake of boys remained low at 772 mg (RNI 1000 mg) while the calcium intake of girls continued the downward trend detected in 1990, to be well below the RNI of 800 mg. Iron intake, which had increased between 1980 and 1990, fell between 1990 and 2000; mean intakes by girls in 2000 were particularly low at 8.7 mg (RNI 14.8 mg).

Positive changes to the diets of young adolescents have occurred, particularly a fall in percentage energy from fat and an increase in 'fibre' intakes. The increasing incidence of overweight against falling energy intakes and decreasing intakes of calcium and iron indicate that detrimental changes have also occurred in the lifestyle and diet of young adolescents. Action is required to reverse these negative trends while maintaining the positive dietary changes achieved by this age group.

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Body mass index from young adolescence to adulthood: a 20-year follow-up. By A. LAKE, A. CRAIGIE, M. GIBBONS, C. WOOD, A. ADAMSON and A. RUGG-GUNN, *Human Nutrition Research Centre, University of Newcastle, Wellcome Research Laboratories, Royal Victoria, Infirmary, Newcastle upon Tyne NE1 4LP*

The UK is facing an obesity epidemic with reported figures of 17.3% for men and 21.2% for women (Department of Health, 1998). Even in childhood, obesity is a prevalent condition and has been associated with an increased risk of obesity in adulthood (Kolata, 1986). It has been observed that most adult obesity treatment programmes only result in small reductions in weight which are not often maintained (Guo *et al.* 2000). In strategies to reduce obesity incidence it may be more advantageous to identify high-risk individuals at an early age and begin prevention in childhood rather than rely on weight management in adulthood. Previous studies have indicated that BMI in childhood has a stronger effect on adult BMI than birth weight and adult lifestyle factors (Guo *et al.* 2000). It is therefore essential to find out how stable relative adiposity is through the transition from childhood, through adolescence and into adulthood and from what age the onset of adult obesity may be most accurately predicted.

A group of 405 adolescents in Northumberland, initially aged 11–13 years in 1979/80 were followed up in 2000/01 when they were aged 30–32 years. Of these 204 agreed to take part in a follow-up study. This investigation examines 196 subjects (115 female, 81 male) for whom weight and height were obtained in both 1980 and 2000.

The height and weight of each child were measured in 1979 using a sliding headpiece and SECA scale, with jacket and shoes removed: height was measured to the nearest 0.25 cm and weight to the nearest 0.5 kg. The height and weight of these subjects were collected again in 2000, using a portable stadiometer and digital scales, in light indoor clothing and without shoes: height was recorded to the nearest 0.1 cm and weight to the nearest 0.1 kg. BMI was calculated (kg/m^2).

Percentile ranks of BMI 1980 and 2000 defined by quartiles

		1980 (%)				
	BMI quartiles	**Lowest 1 (≤16.4)**	**2 (16.5–17.7)**	**3 (17.8–19.6)**	**Highest 4 (≥19.7)**	
2000 (%)	**Lowest 1 (≤23.4)**	51	27	20	2	100
	2 (23.5–25.7)	25	35	29	12	100
	3 (25.8–29.1)	22	25	25	27	100
	Highest 4 (≥29.2)	2	14	27	57	100
		100	100	100	100	100

In 1980, the mean height was 1.48 m and mean weight was 40.0 kg. In 2000, mean height and weight were respectively 1.69 m and 76.6 kg. In 1980, the mean BMI was 18.2 (SD 2.82, 95% CI 17.8–18.6), in 2000 the mean BMI was 26.6 (SD 4.61, 95% CI 25.9–27.2).

The range of BMIs in both 1980 and 2000 were ranked and divided into quartiles. Of the 30–32 year-olds who had been in the lowest quartile as adolescents 51% remained in the lowest quartile as adults with a BMI of below 23.4. Of those that were originally identified in the highest quartile at age 11–12 years, 57% remained in that quartile, with a BMI of >29.1. Similarly, 94% of the young adolescents who were in the highest quartile in 1980 went on to be overweight (BMI >25) as adults, 47% became obese adults (BMI >30). Pearson correlation was used to measure the strength of association between BMI in young adolescence and in adulthood. A highly significant correlation was identified ($P<0.001$, R +0.532). These data indicate that BMI does track from adolescence through to adulthood. The incidence of obesity in children in Britain is a serious and increasing public health problem (Chinn & Rona, 2001). This work indicates that this increasing incidence will follow through to adulthood. Strategies aimed at reducing obesity in childhood could have an important influence on the health of the future adult population.

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